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ABSTRACT

Three possibilities are discussed for providing communications skills to engineering students. In preference to having the English department teach technical writing to engineers, with either total or partial control of methodology, the authors recommend that engineering educators undertake the task themselves. (MLH)

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TECHNICAL COMMUNICATION: THE ENGINEERING EDUCATOR'S RESPONSIBILITY

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TECHNICAL COMMUNICATION:
THE ENGINEERING EDUCATOR'S RESPONSIBILITY

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When we say that the engineering educator should assume responsibility for the teaching of technical communication, we are aware that this may not be good news to the technical faculty, who probably have quite enough to do as it is. And it may not be good news to English faculty faced with overstaffing resulting from declining enrollments. So let us begin with a statement on which we can all agree: graduates of engineering degree programs must have substantial communication skills if they are to function effectively in industry and government. It is a fact that most engineering graduates spend considerably more time writing--letters, memos, proposals, reports--than do

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graduates of liberal arts programs. Yet engineering education focusses almost entirely upon preparing engineers to perform technical work, and devotes little attention to preparing them to communicate the results of that work.

Another statement on which most of us can agree: graduates of engineering degree programs often wish they had had more training in communication skills in college. Practicing engineers in industry and government strongly recommend emphasis on written communication in the engineering curriculum, as the "Goals of Engineering Education Report" indicates.[1]

Perhaps we can agree, then, on the need to stress communication skills in engineering education. But given this need, what can engineering educators do to meet it? We see three possibilities: (1) let the English department teach technical writing; (2) contract with the English department to teach technical writing but with control remaining in the engineering college; and (3) have engineering educators undertake the task themselves. We recommend the third alternative. The probabilities for good courses, well taught, and designed to train engineering students to write as professional engineers are far higher if engineering educators undertake these tasks than if any one else does.

Why not turn technical writing over to English departments?

Some readers may be surprised when we say that an obvious solution to the problem is to let English departments do it. In the past, English departments have not usually favored technical writing. Indeed, they have not even been enthusiastic about Freshman Composition, their traditional bread-and-butter course. But times have now changed. Because of declining enrollments, English departments are considering inauguration of technical writing programs.[2] Engineering educators, however, must beware of entrusting technical writing to English departments. First, English departments tend to view technical writing in terms of their traditional goals. Second, some of the basic writing principles taught in English composition courses are antithetical to basic principles of technical writing. Third, most professors of English are trained to teach literature, not composition. The primary mission of English departments is to teach the history and criticism of English literature.

The traditional tasks of English departments have been--in a descending order of priority--to train

graduate students to teach literature, to educate undergraduate English majors, to offer elective courses in literature for other liberal arts students, and to teach Freshman Composition. As these departments turn to technical communication, they are likely to maintain this same set of priorities. The attitudes are very likely to be those of Merrill Whitburn in his article, "Technical Communication: An Unexplored Area for English": "My own inclination," he writes, "is toward an education that results in a teacher conducting courses in both literature and technical communication. Such an education would be more likely to ensure humanistic as well as practical goals."[3] In other words, he sees technical communication as a kind of frontier that will accommodate the excess population of Ph.D.'s in English. The English teacher is likely to consider technical writing just as he now considers English Composition--of secondary importance.

For an English department, these may be appropriate goals and priorities. But we believe that they do not coincide with the development of sound programs in technical communication. Because of its concern with unambiguous, rational statement, technical communication has an important societal function that differs from the partly affective functions of the expository

writing taught by most English departments. Technical communication programs should be designed to educate engineering students for their future professional roles in industry and government.

The second reason we are skeptical about turning technical writing over to English departments is that some of the principles taught in English composition are antithetical to basic principles of technical writing. The principles taught in English composition derive from classical rhetoric, from the literary tradition, and from such humanistic educational objectives as self-awareness. Although the experienced technical writing teacher judiciously applies these principles to technical writing, he or she often finds principles derived from these sources to be quite inappropriate. Professor W. Earl Britton, for example, one of the founders of the discipline of technical writing, says, "When I try to teach technical writing to students who have had the conventional first year course, I run smack into all the characteristics that I have labeled as wrong about the course."[4]

Many English professors do not realize--or do not accept--this difference. They do not perceive that the technical writing professor, like the engineering professor, must be expert in the "real world" of his

discipline.[5] If the engineering educator, then, sends engineering students to English departments to learn technical communication, he risks having his students taught principles which are in conflict with engineering principles. The students may not be taught how to communicate as professional engineers must communicate in their roles in industry and government.

The third reason we are skeptical about turning technical writing over to English departments is that most English professors, and certainly most graduate assistants, have had no training in communication or composition. Malcolm G. Scully, in his article "Crisis in English Writing,"[6] quotes Robert F. Hogan, executive secretary of the National Council of Teachers of English, who says, "it is now possible for a future teacher of high school English to go all the way through high school, college, and into the teaching profession without having had a course in composition since the ninth grade." The same is true of college teachers of English. Except for a course in the history of the English language, most professors of English have had to take no course in rhetoric, communication, composition, or the teaching of writing. The

result is, as Professor Thomas M. Sawyer has pointed out, in English departments courses ostensibly devoted to writing "drift gradually into a discussion of literature with some compositions thrown in."[7]

The same thing could happen with technical writing. For example, we recently heard a new teacher of technical writing at a national conference of English teachers inquire of a room full of technical writing teachers, "what literature would go well in a technical writing course?" While there were some raised eyebrows, a fair number of voices suggested various works of literature. That is, we think, a disturbing sign.

Then how does technical writing get taught?

If we reject the alternative of letting the English department teach technical writing, we see two other ways to get technical communication taught. Engineering educators can either contract with English departments to teach technical writing, but with the engineering college controlling what goes on, or the engineering educators can do it themselves. While the first of these two has advantages, it also has significant disadvantages. Therefore, we conclude,

engineering educators should assume responsibility for teaching technical writing. Technical writing should be taught primarily for professional goals; it should be based on principles intrinsic to those goals; and it should be taught by appropriately trained teachers. We think that engineering educators can implement these controls more easily than they can persuade English departments to accept them.

Technical writing should be taught as a professional course to complement the engineer's professional training. It should not be a course in technical journalism or popular science writing designed for technical writers who will work in public relations and publications departments in industry. Instead it should be a course in technical communication of the sort performed by practicing engineers. This means it should be at the advanced undergraduate and graduate levels,[8] and ideally should be taught in conjunction with design courses, research projects, and actual job situations. For all this to occur, technical writing teachers should be knowledgeable about engineering, familiar with the engineering curriculum, and sympathetic to the needs of engineering students.

Where, then, are engineering colleges to find the teacher to design such a course. An English department has its own roles to fill for its own majors, for other liberal arts departments, and for other schools and colleges in addition to engineering. Courses in technical writing do not conveniently fit in with these roles. For example, the predominant focus on literature leads English departments to establish criteria for tenure, promotion, and merit salary increases that favor teachers of literature. On the other hand, the professional orientation of engineering departments leads them to require their professors to have industrial experience. Thus, an English department would not be disposed to reward the technical writing teacher whom the engineering college would require to work in a local industry. Even if the English department were so disposed, its professional staff could not easily evaluate the scholarly and pedagogical contributions of the technical writing teacher. For the engineering college to contract with the English department to teach technical writing, therefore, is impractical because it requires the English department to accept uncharacteristic controls, goals, and values.

If contracting with English departments to teach technical writing is an undesirable possibility, we

think a preferable approach is for engineering educators to assume responsibility for having writing taught in the college of engineering. This can insure that the course is designed as a professional course. Furthermore, it can insure that the course is integrated effectively into advanced engineering programs. Either by hiring teachers whose primary function is to teach technical writing, or by having selected engineering professors incorporate instruction in technical writing into selected engineering courses, the engineering college can insure that technical writing is taught in a way that is both compatible with the goals of engineering education and well-integrated into the engineering curriculum.

A teacher of technical writing hired by the engineering college can devote his or her career to teaching and research in technical writing, and to associated professional activities. Without fear that his or her work may well be regarded as unscholarly--as it is in many English departments--he or she can design technical writing courses that complement advanced engineering design courses or research projects. The teacher can research the writing done by professional civil engineers in consulting firms, for example, and design technical writing

courses accordingly. The teacher can do basic research on communication theory. The teacher can participate with engineering faculty in funded research projects as an investigator whose function is to coordinate inputs and write the research reports. In all of these activities the technical writing teacher can serve colleges of engineering in ways that are at once personally rewarding and professionally productive. The result is almost certain to be superior to the result gotten by English teachers.

These advantages would be possible because the engineering college could define the role of the technical writing teacher without having constraints imposed by other units in the university. The college could enable the technical writing teacher to gain access to professional activities in industry and government, access that a member of the English faculty would find difficult to obtain. The college in general could provide the support necessary for the technical writing teacher to design courses specifically for its students and to gain the practical experience necessary to become a true professional. Whether the engineering college brings to its faculty one technical writing teacher or many--or creates its own department[9]--by assuming administrative responsibility for technical

writing instruction the college insures commitment of teachers of technical writing to the professional goals of engineering education.

In addition to hiring teachers of technical writing, colleges of engineering should have engineering faculty teach technical writing. This has significant advantages because instruction in technical writing can be integrated completely into advanced engineering courses. Such an arrangement is more plausible than engineering faculty might first assume. When engineering faculty examine the principles of technical writing and appropriate technical writing texts, they will realize that they may be more qualified to teach technical writing than many English professors.[10]

In order to teach technical writing, the engineering faculty must first reassess their attitudes toward it. They must define technical writing as a professional course rather than as a basic skills course. This, admittedly, may take some effort. Our experience has been that engineering professors assume that technical writing is a foundation course akin to the mathematics, physics, thermodynamics, and statics courses an engineering student takes in his first two years. This is a mistaken assumption. Technical writing should be an advanced engineering course in which the design of

a report is seen as analogous to the design of an engineering system. In this course, as in advanced engineering courses, students should apply theory--in this case communication theory--to real world problems. Our experience is that most of our students are quite capable of doing this. At Michigan, for example, where technical writing is restricted to seniors and graduate students because only they have had enough engineering to be able to write effective, professional technical reports, many of our students have had their work published or used in research projects and on jobs they actually hold in industry. One student, for example, coauthored with a professor an article describing an educational laboratory in contemporary digital design. Another student on a research project wrote the progress reports submitted to the Department of the Army by the principal investigator, his professor. A third student, working for a consultant engineering firm, wrote reports to a city administration about methods for preventing shoreline erosion. The technical writing done by these students was completely professional.

When engineering faculty view technical writing as a professional course, they are in a position to define the principles of technical writing in a way appropriate for teaching technical writing as an applied

engineering course. Chiefly this means they must reassess the writing they have their students do and the uses to which that writing is put. In a chemical engineering design project course, for example, instead of having the students write reports for professors, engineering educators can have students write as they would write on the same material in industry. Instead of looking at student writing merely as a convenient way to monitor the students' educational progress, engineering professors can look at student writing as an instrumental application of course material. In our article, "Communication in 'Real Life' Engineering Courses: Completing the Bridge,"[11] we explain how engineering professors can have "student reports model those required in industry." The hypothesis of the article is that although the engineering professor ordinarily does not think of himself as a teacher of communication, perhaps better than anyone else he is in a position to teach communication of the sort required of practicing engineers. The professor asks his students to simulate "real life" technical activities; all he must do to teach technical writing is to ask students to simulate real life technical communication activities as well.

In this paper we have argued that the responsibility for technical writing should reside in the engineering college. Perhaps this argument will offend our colleagues in English departments. But we mean no slight to English departments. Rather, we intend to suggest that the students are better served--both in engineering colleges and in English departments--if the educational goals in the curriculum are clearly compatible with the needs of the students and with the value systems of the respective disciplines. Because technical writing is a professional discipline with its own role in education and in society, it should not be regarded as an extension of English Composition. When engineering educators view technical writing as a discipline closely related to professional engineering activity, they will realize they must assume the responsibility for teaching it.

NOTES

1. "Goals of Engineering Education Report," Engineering Education, January, 1968. Ninety-nine percent of the respondents "strongly recommended" this emphasis on written communication.

2. To see how far times have changed, engineering educators should read Merrill Whitburn's article, "Technical Communication: An Unexplored Area for English," in the Association of Departments of English Bulletin, May, 1975, pp. 11-14. This Bulletin is the professional journal for chairmen and administrators of English departments in American colleges and universities. Professor Whitburn concludes his article with this statement: "In the absence of firm steps by English, disciplines like engineering will now move into the area of technical communication. This would not only be a real loss of opportunity for English departments , but a loss to the students and to the field itself, since I firmly believe that English is the discipline most likely to move technical communication toward humanistic as well as practical goals."

3. Ibid., p. 13.

4. W. Earl Britton, "The Trouble With Technical Writing Is Freshman English," Journal of Technical Writing and Communication, Spring, 1974, pp. 127-131.

5. These differences in objectives caused many established teachers of technical writing, often former English professors, to spend years retraining themselves to teach technical writing, the retraining an arduous task of establishing intimate connections with scientific and engineering disciplines and of conducting research on communication in government and industry in a manner for which their Ph.D. training in English literature did not prepare them.

6. Malcolm G. Scully, "Crisis in English Writing," The Chronicle of Higher Education, September 23, 1974, pp. 1, 6.

7. Thomas M. Sawyer, "First Things Last: Composition for Seniors, Not Freshmen," Journal of Technical Writing and Communication, April, 1971, p. 142.

8. Thomas M. Sawyer, "Real Life Writing and Speaking," IEEE Transactions on Education, August, 1974, pp. 164-166.

9. Some colleges of engineering--Michigan, Virginia and Washington--have their own departments of humanities and social sciences. These departments develop other fields as well as technical writing, such as the history and philosophy of technology or technology and society, that are anomalies in traditional liberal arts departments. Thus these departments contribute to the engineering curriculum in many areas, not just in technical writing.

10. The Department of Humanities at The University of Michigan has used Ph.D. students in engineering as teaching fellows in technical writing courses. See Wilmer K. Schnure, "An Engineer Teaches English," Journal of Technical Writing and Communication," Fall, 1974, pp. 279-284.

11. Proceedings of the North Central Section Meeting of ASEE, Morgantown, West Virginia, April 11-12, 1975, Vol. 5, American Society for Engineering Education, Washington, D.C., April, 1975, pp. 10-17. This article suggest ways by which professors can have their students write reports to model reports in industry. We also discuss this in our book, Designing Technical Reports: Writing for Audiences in Organizations. In addition, we recommend Basic Technical Writing by Herman W. Weisman and Technical Writing by Gordon H. Mills and John A. Walter. These texts also discuss technical writing as a professional activity rather than as an extension of English Composition.